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MOUNTAINEERING

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Cover photo by Roger Robinson

MOUNTAINEERING IN DENALI NATIONAL PARK AND PRESERVE

Dear Climbers:

The information in this booklet is for the safety, convenience, and well-being of persons planning technical or expeditionary climbs in Denali National Park. The suggestions discussed are derived from more than fifty years' experience of Mount McKinley (Denali) expedition members and park staff and from consultation with prominent mountaineers and alpine clubs.

The following is a brief summary of the major steps that are necessary to participate in mountaineering expeditions in Denali National Park and Preserve:

1. Obtain all the information possible on the scope of the proposed climb. The mountaineering staff will be glad to help.
2. Expeditions to Mount McKinley and Mount Foraker must submit individual registrations to the Mountaineering Rangers prior to the expedition, and check in with the Mountaineering Rangers before and after the climb.

To avoid confusion, it is imperative that one team member handle all correspondence with the National Park Service, air carriers, or support organizations. The name of the expedition should be used on all correspondence.

3. For climbs other than Mt. McKinley and Mt. Foraker, we request that all mountaineers check in with the National Park Service Mountaineering Rangers in Talkeetna or at Denali Park Headquarters immediately before and after the climb.

We, the mountaineering staff at Denali National Park, want to assist you as much as possible in having a safe and successful experience in the Alaska Range. Please feel free to ask us for information and assistance or to contribute your experience to future editions of this booklet.

Mountaineering Rangers
Denali National Park



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**SEND ALL INQUIRIES, REGISTRATIONS,
AND CORRESPONDENCE TO:**

Mountaineering Ranger
Denali National Park and Preserve
P.O. Box 327
Talkeetna, Alaska 99676

EXPEDITIONARY MOUNTAINEERING

Mount McKinley (Denali) at 20,320 feet (6,194 m) is one of the coldest mountains in the world. The peak is located 35 degrees of latitude further north than Everest and less than 200 miles south of the Arctic Circle. Temperatures on the mountain during the spring and summer climbing season may be as low as -40°F (-40°C) and accompanied by winds of 80 to 100 mph (130 km/h) lasting for several days. The combined effect of cold, wind, and altitude may well present one of the most hostile climates on Earth.

"Today we descend from our camp on the West Rib at 16,000 feet (4,876 m) to 11,200 feet on the West Buttress in what was one of the most terrifying days I have ever spent in the mountains. By the time we arrived at camp below Windy Corner (12,500 feet/3,810 m), the gusts were in excess of one hundred miles per hour and gusting once every twenty seconds. The effort and likelihood of getting a wall up was equivalent to the risk and effort of getting to a lower elevation, so we continued to descend. The winds continued to increase as we continued down. One of the gusts knocked all nine of us to the snow. I got up quickly during a brief lull and completely to my surprise I was swept into the air and flew until my rope came tight. That gust must have been in excess of 150 mph (240 km/h). I don't ever recall a feeling of such helplessness in the mountains. Had it not been for the fact that most of the rest of the team were still trying to get up, it's quite possible we all could have been swept off the mountain and down onto the Peter's Glacier several thousand feet below."

*From the journal of
Michael Covington, Guide
June 5, 1980*

These arctic conditions may prevail on most of the major peaks in the Alaska Range. Climbs in the Range are far more difficult than climbing high peaks farther south. Each is a major expedition in an arctic environment with climbing times commonly exceeding 25 days. *Superior mountaineering skills, stamina, conditioning, equipment, and ability to survive in severe arctic conditions are essential.* Experience has shown that even these qualifications do not guarantee safety or success.

"Whenever there is a cloud in the vicinity of McKinley, it contains snow. In most ranges one can climb in a cloud without being troubled by its annoying contents except in an actual storm. But there were no simply fluffy clouds here; it nearly always snowed when we were climbing, going through the range of little storms, average storms, to big savage storms."

*Dougal Haston
"Mount McKinley, 1976"
American Alpine Journal, 1977*

Expeditions, even those planning alpine style ascents, should have supplies to wait out one to two weeks of bad weather.

Alaskan glaciers are often heavily crevassed and glacier travel may be hazardous. Radio communication with outside monitors is extremely difficult from lower elevations. Each party must depend on its own resources for the duration of their climb.

The Party. The party should have at least four members. A large party is better as it provides greater inherent strength and self-rescue capability. Each member of an expedition should be well experienced in glacier travel, extreme cold weather survival, and extended expeditionary mountaineering. The more difficult routes are technically very demanding, and all members attempting these routes should be highly skilled climbers.

Experience has shown that a party composed primarily of individuals who have not climbed together tends to be a weak climbing group. Such mail-order expeditions are not recommended.

The expedition leader/organizer must know the physical qualifications, physical condition, and the experience of each team member. He or she should be able to verify claims made on each member's registration forms.

Solo Climbing. Each year the National Park Service receives several inquiries concerning solo climbing on Mount McKinley. While several solo ascents have been completed in the past, this activity is discouraged in most instances. Solo travel on the lower glaciers is especially hazardous. Crevasse falls are common on even the popular, well traveled routes. A fall by a member of a roped party may only be an inconvenience. For a solo climber, the same fall could be fatal. A solo climber has virtually no self-rescue ability in the event of a serious accident or illness, and creates undue risks to the search or rescue party.

GENERAL INFORMATION

Permits. Although all climbers must *register* for climbs of Mount McKinley and Mount Foraker, mountaineering *permits* are not required to climb in other areas in Denali National Park. However, some groups may need to obtain a backcountry permit (see below). There are no limits placed on the number of climbers attempting a route on any mountain in the park. However, several parties on the more technically difficult routes could present a hazardous situation. Climbers should check with the Talkeetna Ranger Station or Park Headquarters for current information on these routes. Fees are not charged to climb in the park.

Backcountry Permits. Groups approaching the Alaska Range from the north side, except for those registered for routes on Mount McKinley, must obtain a backcountry permit. A limit is placed on the number of persons allowed in separate backcountry zones approaching the Range to protect the fragile tundra environment; however, mountaineering groups are exempt from these limitations. Check at the Riley Creek Information Center for backcountry permits.

Lower Peaks. Climbs of lower peaks which can be made within a short distance of the park road vary in difficulty. It is advisable to be particularly cautious on these shorter climbs as conditions may be severe even at low altitudes. It is recommended that climbers planning short climbs in these areas check in and check out with the Mountaineering Ranger. Registration is required only for Mount McKinley and Mount Foraker. However, each party must check with the Backcountry Desk at Riley Creek Visitor Center or Park Headquarters to obtain the necessary backcountry permit for the approach into these areas.

Climbing Seasons. Snow conditions and weather for climbing major peaks are usually best from early May through early July. Colder minimum temperatures commonly occur in May. June and July are warmer but plagued by more unsettled weather. By August, travel on the lower glaciers is made difficult by the melting of snow bridges over crevasses and by more inclement weather with heavier snowfall.

Routes. The West Buttress, South Face, and Muldrow Glacier routes are the most frequently climbed routes on Mount McKinley. Several other routes have seen only one ascent. Mount McKinley is attempted by 600 to 850 people a year. over $\frac{3}{4}$ of these are on the West Buttress route. An expedition on the West Buttress route might encounter 100 to 200 other climbers. Fifteen to twenty parties a year attempt the routes on the South Face of McKinley.

The National Park Service has reference materials on routes on Mount McKinley and other peaks in the park. Specific questions on mountaineering in the Alaska Range can be answered if you are unable to find information elsewhere. Valuable information often may be obtained from members of previous expeditions. A list of recommended reading materials is included at the end of this booklet. Specific route descriptions may be found in the American Alpine Journals.

High quality photographs of major peaks and routes in the Alaska Range are available. Contact Bradford Washburn, Museum of Science, Boston, Massachusetts 02114, for information and a current price list.

Approaches. From the south the usual approach is by ski plane from Talkeetna to the Southeast Fork of the Kahiltna Glacier or to other glaciers on the south side of Mount McKinley. Some groups have walked or skied in from the Anchorage-Fairbanks highway or from the Peters Hills. From the north the usual approach for Mount McKinley and other peaks is by foot, ski, or dogsled from Wonder Lake. The route is cross-country 18 to 20 miles (29-32 km) to McGonagall Pass or the Peters Glacier area. A major challenge and potential danger on the route is fording the McKinley River.

Guide Services. Certain guide services are authorized to guide mountain and ski expeditions in the wilderness boundaries of Denali National Park. Each service meets standards established by the National Park Service to insure a quality operation. All operators are reviewed periodically to maintain a high standard. A list of authorized guide services is available from the Mountaineering Rangers.

Each of the guide services offers a variety of climbing and skiing expeditions. Generally food, community equipment, and experienced leadership are provided by the guide service. Climbers interested in joining a guided expedition or hiring a guide for an expedition should contact each guide service directly.

Crevasses. Alaskan Glaciers are heavily crevassed. *All climbers should be roped for any glacier travel and must be familiar with crevasse rescue techniques.* A number of climbers have died from unroped falls on Mount McKinley and the surrounding glaciers. Before unroping, the camp area should be thoroughly checked for possible crevasses.

EQUIPMENT AND SUPPLIES

The following are the minimum recommended equipment items for a party of four. Everything should be in good condition.

Boots. The military vapor barrier boot has an outstanding record of frostbite prevention. Other footgear which may be acceptable, depending on conditions, include the double insulated climbing boot (with leather or plastic shells; carry extra liners) used with an insulated overboot that covers the bottom of the boot. Many climbers have found that the supergaiters do not provide sufficient insulation for Alaskan conditions. Conventional leather boots (single boots) are unsuitable for the extreme conditions on the higher peaks. *Please do not take this information lightly.* Very severe conditions will be encountered at higher altitudes even in summer. If skis are used, ski boots should be a double insulated variety.

Snowshoes or Skis. One pair per person, with complete repair materials. Skis should be used by experienced ski mountaineers. Climbing skins are necessary. Snowshoes must be well made for hard use. They are frequently broken. Extras should be considered.

Stoves. At least two, of proven efficiency at high altitudes and extreme cold. Carry extra stove parts to make repairs when necessary. Some parties have had trouble in very cold weather with a disposable gas-cartridge model, especially when domestic cartridges were used. Fuel consumption varies, but allow for the worst possible conditions. Extra fuel is cheap insurance. Many parties plan on using between $\frac{1}{4}$ and $\frac{1}{2}$ pints (.25 l) of fuel per person per day.

Ice Axes. One per person plus at least one spare for the party. They are easily lost during falls into crevasses.

Crampons. One pair per person, of proven quality, carefully prefitted to the footgear to be worn. A spare pair of adjustable crampons is advisable for each party.

Snow Shovels. At least two. They are essential for leveling campsites, digging snow caves, digging out buried tents, digging latrines, and have been used in some places to cut a travel route. Small, lightweight snow shovels commonly sold in mountaineering supply houses are almost useless under McKinley conditions. They lack both sturdiness and capacity. Large (approximately 14"x 18" or 35 x 45 cm) aluminum grain scoops which weigh only about three pounds (1.4 kg) have proven extremely valuable and are highly recommended. They can be purchased at many hardware stores.

Snow Saws. At least two. They are essential for building igloos, snow caves, or walls of snow blocks. They should be extremely sturdy, with a large handle, a stiff blade, and large teeth.

Tents/Shelters. Tents should be of expedition quality. Extra poles and repair materials are important because of the frequency of damage in storms. Light, water repellent materials with impervious floors and frost liners are most desirable. A rain fly is important at low elevations. Remember that winds in excess of 80 mph (130 km/h) are common and may last for many hours or even days. They may be accompanied by temperatures -40°F (-40°C) or colder. In such conditions, failure of a tent may be disastrous.

The large dome-shaped, three- or four-person tents are preferred by experienced expedition climbers. They are less susceptible to drifting over and are infinitely more comfortable and convenient to live in. It is possible to dry damp clothing in a larger tent while it is extremely difficult in a two-person type. In large tents and igloos, it is also possible to conserve body heat by several climbers sleeping under a common tarp cover. However, even the best and largest tents will not provide comfort and rest during severe wind storms common on Mount McKinley. During these storms, tents are likely to fail; furthermore, the noise of flapping tents becomes nerveracking, causing significant mental and physical fatigue. Under these conditions, igloos or snow caves should be used whenever possible. *Each climber should have experience in building such shelters before attempting Mount McKinley or Mount Foraker.* Practice at lower elevations may be profitable. Many experienced mountaineers feel the extra effort required to construct igloos or caves is cheap insurance against McKinley's sudden arctic storms. It can be a very difficult and desperate task to build one of these shelters once a major storm has struck.

Radio. A two-way radio capable of communicating with an outside station and several sets of batteries are highly recommended. For many years, radios were required for all parties climbing on Mount McKinley and Mount Foraker, and their use has been instrumental many times each year in saving the lives of sick or injured climbers. Without a two-way radio, a climbing party in distress may have no method of summoning help. We strongly recommend that all parties carry a radio, especially those groups that are climbing on routes where there may not be other climbers nearby. Many experienced climbers carry a radio with them for any trip in the Alaska Range.

Three or five-watt Citizen's Band (CB) radios are used by most climbers. Most glacier pilots have CB radios in their planes and monitor these radios while flying over the mountains. Also, for most of the climbing season, there is someone at the Kahiltna Glacier Base Camp monitoring the CB radio. Channel 19 is the most frequently used channel. There are few CB stations capable of monitoring the north side of the Alaska Range.

Line of sight portable receivers (FM), weighing two to three pounds (1-1.4 kg) and capable of reaching 24-hour telephone operators in Anchorage and Fairbanks may also be available. Both these and the CB radios are line-of-sight only and are usually functional only above 13,000 to 14,000 feet (4,300 m) on most routes. However, the CB radios have the advantage of allowing communications between expeditions on Mount McKinley and other peaks. In this way, messages from lower altitudes often can be relayed by other climbing groups. Radio batteries should be warmed up before the radio is used and should be kept warm in use if at all possible.

Signal Devices. Because radio communication may not be possible from all locations in the mountains, it is recommended that other types of signalling devices be carried. Smoke flares, signal mirrors, portable ELT's (emergency locator transmitters), and rocket-type flares may be useful.

Trail Markers (Wands). Adequate number for the proposed route. At times it may be impossible to see markers only 100 feet (30 m) away. Trail markers are essential for safety, especially during bad weather. Approximately 350 wands spaced about 250 feet (75 m) apart will mark most of a route from 6,500 feet (2,000 m) to the summit of Mount McKinley. Fifty to 100 wands should be adequate for the more heavily used routes. Five-foot (1.5 m) wands may be desirable for marking caches and in deep snow below 11,000 feet (3,300 m). For safety, wands should be not much more than a rope-length apart when high on the mountain.

Sleeping Bags. Of expedition quality. They should be of the mummy type with three pounds (1.4 kg) or more of down or Polarguard, and with a water repellent cover. Extra insulation beneath is essential. Foam filled air mattresses are popular but are prone to develop leaks that are hard to repair. These pads are often used in combination with a closed cell foam pad. Be sure that the type of foam pad you use will not get stiff and crack at cold temperatures. Adequate sleep is essential at high altitudes. Do not economize on weight in regard to sleeping gear.

Rope. At least one 120 foot X 3/8 or 7/16 inch (35 m X 9 or 11 mm) Perlon rope for each two climbers, with a spare for crevasse rescues and miscellaneous purposes. Water repellent ("everdry") ropes are very popular for glacier travel. Polypropylene, or other ropes with little stretch, are normally used for fixed ropes.

Crevasse Rescue. Mechanical ascenders (Jumars, Gibbs, etc.), prusiks, pulleys, or other suitable crevasse rescue equipment should be carried. *All members should be familiar with crevasse rescue techniques.*

Sun Goggles. Proven quality, very dark, two pairs per person. Amber lenses and sun glasses with open sides are inadequate. The glare is remarkably intense, even on cloudy days. High altitude sunscreen (zinc oxide or a total sunblock) is essential.

Medical Kits. One complete kit should be available to each segment of a party. It should include sun cream or zinc oxide, medications for pain, and antibiotics with carefully written instructions on their use. It is of the greatest importance that expedition members consult at length with a physician about field treatment of common emergencies.

Sleds. Sturdy plastic sleds are very useful on the lower glaciers for shuttling loads. A single climber can pull loads of 30 to 40 pounds (14-18 kg) with little difficulty. Heavy duty haul bags or bivouac sacks may be used also. Sleds or sacks are useful for carrying garbage on the descent. They may also be useful for evacuating sick or injured climbers to a lower elevation.

Repair Kits. Should contain wire, twine, pliers, patching material for vapor barrier boots, repair materials for bindings and tents, extra generators, and miscellaneous parts. Plan your repair kit according to the equipment that you carry.

Food. Adequate to last for the expected duration of the climb plus a large reserve for unexpected emergencies. Most groups take 2½ to 3½ weeks to climb the West Buttress route. The Muldrow Glacier and other routes may take longer. If you fly in to the mountain, plan a base camp food cache in the event that bad weather delays your flight out at the end of your climb. Most expeditions have figured on 4,000 to 5,000 calories per person per day. Some groups have been out more than two weeks longer than expected because of bad weather.

It is important to repack food before the climb to minimize garbage.

Clothing. Adequate for the severest arctic conditions. The best is necessary. Include a down parka, down pants, wind parka, wind pants, plenty of woolen socks, face mask, sun hat, one pair light gloves, and one pair of long insulated mittens (long sleeve).

Extreme conditions can be expected on Mount McKinley at any time of the year. It is difficult for those inexperienced in this degree of cold to comprehend the problems involved in simple survival. Strong windstorms can hit the upper part of Mount McKinley with little warning, and can stop the strongest party if they are not sheltered. However, the temperatures encountered between 7,000 feet and 20,000 feet (2,000 and 6,000 m) may vary as much as 120°F (50°C). Temperatures may range from plus 70°F to 80°F (20°C to 23°C) to as much as -50°F (-45°C). Wind increases the effect of these extremes. Protection from heat and glare are also important. Lightweight, wind-resistant clothing in layers allows for adjustments to be made according to conditions. Down or synthetic fiber clothing is especially good in the coldest weather. A parka hood is essential. Woolen or pile pants worn with woolen or polypropylene underwear and light wind pants are generally used. Two wool or pile shirts or sweaters should be brought. Head gear must provide good ear protection. Mitts should be leather faced, very roomy, with thick removable woolen or fiberpile liners worn over light silk, nylon, or pile gloves. Down mitts are superior for severe cold. Extra mitts should always be carried.

Socks should provide thick, loose insulation. Several extra pairs should be carried. With good vapor barrier boots only light socks are needed. But they often become wet and therefore should be changed frequently. Down or Polarguard filled booties have been praised by most expeditions for wearing in the tent and sleeping bag. If wearing vapor barrier boots, vapor barrier socks, or neoprene socks, carry foot powder to dry out your feet at night.

Some climbers' feet suffer from excessive sweating when wearing vapor barrier boots or vapor barrier sock systems. This can lead to a dangerous condition of immersion foot, even when no freezing injury occurs. Climbers planning to use a vapor barrier system on Mount McKinley should do an extensive test of their system to see if their feet can tolerate the excessive moisture.

Parties approaching from the lowlands of the north or south during the summer months will need headnets, a good supply of strong, effective mosquito repellent, and rain gear.

RESCUE

A climbing party high on Mount McKinley or other Alaskan peaks cannot depend on any sort of assistance in case of emergency. Due to acclimatization restrictions, it would probably be many days before a ground party could arrive on the scene. Clear air turbulence can often prevent air support even on good days. For all practical purposes, a party high on the Alaska Range is alone and must depend upon its own resources if an emergency situation arises. *Injured or ill persons must often be moved to lower elevations by the remainder of the group if at all possible.* This is for the benefit of the injured person and to aid in rescue by a ground party or possible evacuation by aircraft.

The use of aircraft in a high altitude rescue operation or on steep terrain is hazardous.

"Landing a Chinook helicopter on McKinley is like driving a car into a garage at 40 miles an hour and trying to stop before you hit the back wall."

*Russ Hunter, Pilot
Fort Wainwright, Alaska*

Due to weather conditions and availability of personnel and equipment, it may be many hours or several days before assistance can arrive. To delay the evacuation of a climber suffering from altitude illness to a lower altitude may prove fatal. *Do not delay a ground evacuation if bad weather threatens or if an aircraft evacuation is doubtful.*

A rescue by helicopter requires a great deal of time, effort and money in every case. Nowhere in Alaska is there a single mountain rescue helicopter fully equipped and standing by for rescues. To locate a suitable helicopter can often take many hours or even days. And rescue costs are very high. Rarely does a helicopter rescue ever cost below

\$3,000 and many rescues have cost over \$10,000. When an injured or ill climber can be carried down to the lower glaciers and evacuated by a fixed wing aircraft, the rescue costs are much less.

In recent years, some climbing groups have requested helicopter assistance and it has not been possible because of severe weather. These parties, forced by weather to handle their emergency on their own, have been able to safely evacuate a climber to a lower elevation. *All* climbing groups confronted with an emergency situation should first consider what they can do to handle the situation on their own. Next they should try to enlist the aid of other climbers nearby. Finally – and only when all other options have been tried – should the group request additional assistance.

If rescue becomes necessary, the party may request assistance from the National Park Service via the party's radio contact or other means. All information regarding the severity of the situation, current weather conditions, and the availability of other climbers who can assist should be relayed from the scene if possible. Good radio communication equipment is essential. Each climber should realize that his own group is the best and often only source of rescue aid. *Mountaineers will be expected to aid other climbers in emergencies.*

Self-sufficiency. Those who depend upon rescue efforts or the strength and expertise of others to extricate themselves from difficult positions are inviting disaster. Helicopters and/or acclimatized rescuers are often not available or the weather prohibits their response in the Alaska Range. Travel prepared with the knowledge, equipment, strength and common sense to support your own expedition.



photo by Bob Seibert

CLIMBING CLEAN ON MOUNT MCKINLEY

Leave nothing on the mountain. Expeditions in the past have climbed McKinley and have been able to carry out everything brought in.

The most important part of clean climbing in Denali National Park is planning ahead. *Each person must make a strong personal commitment to remove all his garbage, excess food, fixed lines, and other equipment.* Careful planning and repackaging prior to the trip can eliminate much of the garbage resulting from packages (i.e., cans, foil, etc.).

Litter removal. *Everything must be carried off the mountain.* Common bivouac sacks or plastic sleds make excellent descent towing bags, allowing an additional 50 to 75 pounds (20-30 kg) to be carried. Keep litter dry by consolidating it in plastic bags or waterproof stuff sacks. *Only if trash can not be carried off the mountain safely should it be put in a deep crevasse.*

Caches. Leave no permanent caches on the mountain. Often garbage and broken equipment is left in the guise of a cache. In a food cache left by a descending party, only the more desirable food items are utilized by other parties. The remaining cache usually becomes garbage. If it is not buried by snow, ravens peck apart food bags and wind scatters the material. Locating a reported cache can be very difficult. Caches rarely serve their intended function and almost always contribute to litter problems.

To Protect Food. When relaying loads, be careful to cover food caches from ravens. More than one expedition has come to grief from the depredations of these birds. Temporary caches should be buried under large blocks or loose snow several feet deep. Mark the cache with long wands. Clearly mark the cache with the name of your expedition and expected date of return. This will prevent other climbers from thinking the cache has been abandoned. At lower altitudes, grizzly bears and wolverines have been known to destroy caches near the edge of glaciers.

Human waste and sanitation. Intestinal disorders, vomiting and diarrhea may result from contamination of food, or more likely, drinking water. The resulting dehydration can become a serious problem at altitude. All drinking water is obtained from snow melt. Since most Mount McKinley expeditions camp at sites commonly used by previous expeditions, the chance of gathering snow in the immediate vicinity of a previous expedition's latrine is very high. Conditions become worse as the season progresses as old latrines melt out. For the health and safety of all, it is

imperative for everyone to follow these simple steps:

- 1) Use the public pit latrines where they are provided. At other locations:
- 2) Dig a shallow hole in the snow.
- 3) Line the hole with the proper size heavy duty plastic bag.
- 4) Stake the corners of the bag open (wands work well). When not in use, simply close the top of the bag to prevent it from filling with snow.
- 5) Use the bag as a communal latrine for all members of the expedition while in that camp. A little attention to prevent overfilling will make the process of disposal much easier.
- 6) When you move camp or a bag fills, simply tie it off and toss it into a *deep* crevasse. If no crevasses are immediately available, the bag should be carried until a suitable crevasse is found. The wastes are usually frozen and will ride well on the sled. On steep technical routes, the bag can be tossed away from the climbing route or feces can be deposited on snow blocks and shoveled off the route.
- 7) Crevasse *only* human waste. All trash must be carried out.

Fixed Lines. The use of fixed lines as climbing aids has become a serious problem on popular technical routes in the Alaska Range. As alpine style ascents have become more popular, very few parties leave fixed lines in place. However, those that do add to many old lines already on the route. On the Cassin Ridge on Mount McKinley, as many as twelve lines may be in place in the Japanese Couloir. All fixed ropes must be removed on descent. Fixed lines left by past parties are often in very bad condition and should not be used. In 1974 a climber fell to his death when a fixed line broke during a rappel. Expeditions should make an effort to remove old fixed lines and make a commitment to remove their own fixed lines.



photo by Roger Robinson

ALTITUDE ILLNESS

Mount McKinley's summit is 20,320 feet (6,194 m). Because of its latitude of 63°, barometric pressure is lower for a given altitude above 14,000 feet. Being on the summit of McKinley is physiologically equivalent to being at elevations 1,000 to 2,000 feet (600-900 m) higher in the Himalayas or Andes Mountains.

"The altitude was only 20,320 feet or so, and yet it felt like 24,000 feet. Perhaps there is something in the theory that the low pressure in polar regions makes climbing relatively more difficult than elsewhere."

Mountain 52

So wrote British climber Doug Scott after his and Dougal Haston's successful climb of the South Face of Mount McKinley in April, 1976. This was just six months after the two stood on the summit of Mount Everest. These elevations can put severe stress on the mountaineer, possibly resulting in serious illness or death. In the 1976 climbing season, altitude illness was directly responsible for nine major accidents and was a major contributing factor in at least five other accidents. Three people died in these accidents.

"Except for a few hours of calmer conditions, the storm lasted for several days and forced us to do nothing. Of course, we realized the benefits of such forced idleness, as it offered us an ideal opportunity for high altitude acclimatization. Without proper adaptation to the altitude, major problems can quickly result . . . High altitude pulmonary edema and cerebral edema occur often on Mount McKinley; their treachery forces even the best conditioned climbers to their knees. Again and again, Mount McKinley is underestimated by climbers whose arrogance borders on stupidity."

Peter Habeler
Alpinismus 10/80

It is thought that acute mountain sickness, high altitude pulmonary edema, cerebral (brain) edema, and retinal hemorrhages rarely occur alone. They are all manifestations of failure to adapt to the stress of high altitude and are not individual diseases. Hypoxia (lack of oxygen) is an underlying cause in all cases. The extreme cold of Mount McKinley also apparently contributes to altitude illness, especially pulmonary edema.

Symptoms.

Acute Mountain Sickness (AMS): Headache, loss of appetite, irritability, weakness, nausea, disturbed breathing and sleep.

High Altitude Pulmonary Edema (HAPE): Shortness of breath, rapid heart and breathing rate, weakness, gurgling in chest, cough, changes in consciousness leading to death.

Cerebral Edema (CE): Headache, vomiting, staggering, lethargy, progressive deterioration leading to coma and death.

Retinal Hemorrhage (RH): Rarely symptomatic; small hemorrhages in the back of the eye.

Illnesses. AMS is common and occurs usually above 8,000 to 9,000 feet (2,400 m). Symptoms appear a few hours after arrival at the new altitude and may worsen, then slowly improve. AMS should dictate slowing down or halting a climb, and the climber should be watched for more serious developments. Light activity, plenty of fluids, and no upward progress are the best treatment. Aspirin or Tylenol can be taken for headaches and Diamox can be started to speed acclimatization and abort AMS. Many parties, experiencing early signs of AMS, have been able to continue to complete a successful expedition by descending 2,000 to 3,000 feet (60 to 100 m) to allow one or two days of acclimatization, then reascending. *Like all forms of altitude sickness, it is minimized or prevented by taking more time to go high.*

HAPE seldom occurs below 8,000 feet (2,400 m). Symptoms begin to appear 24 to 48 hours after a too rapid descent. It is suspected that hard work and cold increases one's susceptibility to HAPE. Symptoms are increasing fatigue, shortness of breath at rest, weakness, and a dry cough. Later, bloody or frothy white sputum and bubbling in the lungs becomes obvious. Usually there is a little fever, the pulse is often fast (90-130 per minute at rest), respirations rapid (20-40 per minute at rest) and lips and fingernails are blue. Other signs of AMS may be present, especially loss of coordination.

Once HAPE is diagnosed, or even strongly suspected, the party must start down. This is the most effective treatment. Oxygen is effective but usually not available, especially in quantities necessary (12 to 36 hours of oxygen breathing). However, no medication, no amount of rest, and not even oxygen is a substitute for getting down. The party is taking a greater risk by delaying evacuation than by starting down at night or in dubious weather. Getting down even one or two thousand feet usually has a dramatic beneficial effect, unless the illness has gone too far, and then further de-

scent to hospital care, oxygen, and medication are necessary to save the life of the victim.

Cerebral or brain edema (CE) is less common. It is unusual below 12,000 to 13,000 feet (3,600 m). Symptoms include staggering as if drunk when walking and sometimes a severe and increasing headache and vomiting. Hallucinations may occur. Behavior becomes irrational and simple tasks impossible. Lethargy leads to decreasing consciousness and the patient may drift into a coma and die. Even more urgently than HAPE, *CE demands immediate descent under almost any conditions.*

The loss of coordination (ataxia) in a cerebral edema can be detected by a number of simple coordination tests. For example, the heel-to-toe walking test. Draw a straight line in the snow and have the person walk on the line, placing each foot directly in front of (touching) the last. Anyone unable to walk normally along the line should be assumed to have CE, and possibly HAPE. High altitude physiological researchers are recommending, based upon recent research, that Dexamethasone (DECADRON), if available, be administered early in CE, in a dose of 4 mg orally or injected, every 6 hours, and the victim should be taken down.

Summary. There is no way of predicting who will or will not develop altitude illness. Physical fitness offers absolutely no protection from altitude illness. Two to four nights spent at 14,000 feet or so is necessary for acclimatization before moving up higher on the mountain. *The best treatment is immediate rapid descent to a lower altitude.* A relatively safe rate of ascent of 1,000 feet (300 m) per day above 10,000 feet (3,000 m) should be adequate, however, even this may be too fast for some people. Anyone with altitude illness who starts down early after onset normally will recover rapidly and completely. As is the case with all medical problems, *prevention* is the most important aspect in the management of altitude illness. Listen to your body, and climb according to how you feel. Remember the adage “carry loads high and sleep low.” Delay moving to a higher camp until you are feeling fit. Never ascend to higher altitude with symptoms of AMS.

CLIMBING PROBLEMS

Much of the following information is taken from material prepared by the Institute of Arctic Biology, University of Alaska, Fairbanks.

Mount McKinley, the highest mountain in North America, offers mountain climbers some of the most severe conditions found anywhere on Earth.

"Throughout the year, one of the coldest climates in the world prevails on Mount McKinley. The high altitude storms, which often appear without warning, are some of the worst I have ever experienced."

*Peter Habeler
Alpinismus 10/80*

As Terris Moore points out in his book, *Mt. McKinley; The Pioneer Climbs*, when the Quartermaster Corps was searching for a place on the North American continent where temperatures of at least -20 °F to -25 °F (-30 °C) could be found, dependably, during the summertime, it chose the high basin between the North and South Peaks of Mount McKinley. Cold, lack of available oxygen, and windstorm potential at this site provided conditions found only thousands of feet higher in other parts of the world. The combination of these factors with long exposure creates severe hardships and poses unique problems for climbers on Denali that are not encountered elsewhere in this country. In most cases, climbers return from McKinley physically weaker than when they left. While trips to lower mountains may help build a climber's strength, a McKinley expedition may drain one's strength and lead to deterioration of body functions.

"Just as the murky sun was dropping over Mt. Foraker, a tremendous blast of wind tore across the face, all but dislodging us . . . In the midst of removing boots, brewing up and getting into the bivi bag, we suddenly found ourselves fighting for survival, groping amongst particles of ice for our boots, gloves, and everything else. The wind continued unabated for the next three hours – the worst few hours that either of us had spent in the mountains. At 15,000 feet, we maneuvered ourselves back into the bag and put the brew back on. We fell asleep with 80 mph winds threatening to pluck us clean off the mountain."

*Doug Scott
April, 1976*

Pre-Climb Activities. Expeditions commonly make the mistake of *rushing* onto the mountain and arrive at a fairly high altitude already physically and psychologically tired from travel and last minute prepara-

tions. It is most difficult to *catch up* on rest once on the mountain, and adequate sleep is essential for this strenuous climb. Plan an extra day at the staging area so that expedition members will start fresh and well organized.

Acclimatization to Altitude. S. M. Tenney emphasizes the importance of acclimatization in climbs over 15,000 feet (4,600 m). The McKinley Park regulation which requires climbers to begin at the park boundary and prohibits air drops inside the park may appear hampering to an eager mountaineer. In actuality this regulation has undoubtedly contributed to the success of many expeditions, because attaining higher altitudes *gradually* is accepted as the best way to acclimatize. Some McKinley expeditions have found it very helpful not to *push* when they move above 14,000 feet (4,300 m) but allow themselves a day or two at each high camp to adjust before moving higher. Carrying loads high and returning to sleep at lower elevations is considered helpful.

"We had climbed roped but simultaneously, front pointing forever into a revived storm and relentless wind. Everything was cold, even our souls. Frostbite was waiting to jump at the slightest weakness, but both of us played our own winning game with it. McKinley's climate is tough. We were drawing heavily on all our Himalayan experience just to survive, and it was a respectful pair that finally stood on the summit ridge. It took a few hours to dig a miserable little hole, but free from wind and spindrift, and there we spent an equally miserable night. We had climbed the mountain too quickly to acclimatize and now we were suffering!"

Dougal Haston

American Alpine Journal, 1977

Physiological and Physical Impairment. Every mountaineer preparing to climb Mount McKinley must be aware that at high altitude he will be physically weaker. He will move more slowly and will not be able to carry very heavy loads. There are also other results of activity at high altitude less commonly known but potentially as dangerous, such as mental impairment, dehydration, lassitude, loss of cold resistance, and lack of recuperative powers. A major environmental variable responsible for some of these effects is the lack of oxygen (hypoxia) associated with high altitudes.

Mental Function. Bradford Washburn has estimated that above 18,000 feet (5,500 m) on Mount McKinley a person is reduced to roughly 50% of his mental capacity. In the winter assault of 1967, three McKinley climbers required approximately twice as much time to answer a series of subtraction problems after remaining at 18,000 feet (5,500 m) for six days as they did at 7,000 feet (2,100 m) on the Kahiltna Glacier. In

retrospect, most high altitude climbers can recall situations in which their thinking was impaired and their judgment poor. These effects are insidious, since climbers are not aware of the impairment at the time. A controlled exposure in a low pressure chamber is often necessary to convince a climber (or flier) that hypoxia affects him. Many high altitude climbing accidents may be attributed to such lack of judgment. Thus, it is important that climbers realize in advance that their mental functions will be impaired. Planning should be thorough and complete to avoid a critical situation which poor judgment and slow thinking would magnify. For example, sudden impulsive decisions to go on or to return must be considered carefully.

Lassitude. At high altitude motivation can diminish greatly. Thus, Joseph Wilcox, leader of a 1967 McKinley party wrote in his diary:

"With five people crammed in the tent, morale decreased rapidly. There was not interest in cooking meals and by the next day no one was even interested in melting drinking water. We found ourselves very apathetic – not caring whether or not we got enough to drink or eat or if our gear was wet – we just lay there and waited with little or no sleep . . . by morning the cold had taken its toll – Jerry Lewis and I had numb feet and I had numb fingers."

Here the motivation to do even the simplest camp chores almost disappeared: yet these tasks – melting snow for water, cooking a hot meal, drying clothes in the wind – will help determine the success and safety of the party. The will to survive and succeed must not be sacrificed to lassitude. Inactivity during tent-bound stormy days can itself be devastating to morale, and as tiring and debilitating as climbing. Washburn stresses how some systematic activity during stormy days such as a short walk, weather permitting, or building a latrine with snow blocks can help to keep the body limber and the mind alert.

Leadership and Interpersonal Relationships. Irritability can easily spring up between close friends during a stay at high altitude. A nagging fear, doubt, or feeling of guilt can easily grow in one's mind and prove mentally exhausting as well as potentially dangerous. Leadership characteristics may undergo drastic change because of the stressful situation. Personality change may bring out latent domineering tendencies in anyone and can be extremely upsetting to group relationships. Being on the mountain may precipitate a variety of phobias, including claustrophobia from living in close quarters, which can lead to panic with an overwhelming desire to run away. In extreme cases a single climber may even leave the group and attempt to descend by himself, which can lead to fatal consequences.

Cold Resistance. Major hazards of a McKinley climb are frostbite and hypothermia. Mount McKinley presents a combination of long exposure, severe weather, high altitude, low temperature and low humidity which makes it one of the most severe climates on Earth. Mountaineering literature contains numerous vivid accounts of frostbite on Mount McKinley such as Bradford Washburn's excellent article which can be obtained from the American Alpine Club. During the 1976 climbing season there were 53 reported cases of frostbite; 14 of these required medical attention. With proper protection, however, this complication need never occur. Adequate clothing, food and water are essential at all times. Three 1967 McKinley climbers had their feet frostbitten while they were in their sleeping bags primarily because they had little to eat and were dehydrated. Subsequently two of these climbers lost portions of their toes. It should be pointed out, however, that they were living at 18,000 feet (5,500 m) for six days with temperatures of -50°F and -60°F (-45°C to -51°C) and winds of 90 to 100 mph (145-160 km/h). If they had not kept calm and retained a degree of awareness of the major problems, or had let panic or unreasonable fear overwhelm them, they might have fared far worse. Cold resistance may be impaired by altered nervous or metabolic regulatory control.

"As we made our way slowly down, we were surprised to see figures ahead. We could make out two climbers sitting in the snow, with equipment strewn all around them . . . They were two lads of about twenty. One was wearing a black silk glove that had ripped apart to reveal yellowing fingers, frozen solid; the other was just sitting stupefied in the snow, his head bowed over his own useless, frozen hands. Yellow Fingers was quite chirpy; joking at the coincidence of our meeting at the summit like this. Dougal asked why his hands were exposed, and received a confident, flip reply. We told him that he had frostbite, and that he would probably lose his fingers, and maybe his entire hand. 'What do you mean, frostbite?' asked Yellow Fingers. We patiently explained, got his gloves and other clothes out of his sac, and did what we could to make them both warmer . . . We heard later that the two lads had to face extensive amputation of fingers, toes, hands, and feet, despite the finest treatment available at Anchorage Hospital."

*Doug Scott
Mountain 52*

Body tissue which is frozen, thawed, and refrozen will be damaged much more than tissue which is frozen only once. It is best to keep a frozen extremity frozen until arrival at a hospital. When that is not possible, all precautions must be taken to insure that the thawed extremity is not refrozen.

Illness or Injury. It is difficult for the body to recover from illness and injury above 14,000 feet (4,300 m). Hypoxia and dehydration seriously impair the body's recuperative powers. A sick person should be taken immediately below 14,000 feet (4,300 m), where he will have a better chance of recovery.

Diarrhea is serious when climbing above 14,000 feet (4,300 m) because dehydration is further aggravated, and with impaired absorption the body receives little nourishment and is further weakened. A person suffering from severe diarrhea should be taken below 14,000 feet (4,300 m) while he can still make the trip down. He should not go up again until his gastrointestinal function returns to normal.

Dehydration. Dehydration is a major hazard of high altitude mountaineering. Dehydration compounds the problems of any illness or injury, making recovery more difficult. The effects of frostbite are much worse when the body is dehydrated.

" . . . taking ample water seems to prevent, minimize, or improve symptoms [of Acute Mountain Sickness], which suggests some basic mechanism beyond simple oxygen lack. The benefits of drinking enough water to make the urine 'gin-clear' have never been proved by controlled studies but they have been proclaimed by many."

Going High

The Story of Man and Altitude

Charles S. Houston, M.D.

Climbers rarely drink adequate amounts of liquids above 14,000 feet (4,300 m). Fuel for melting snow is not difficult to carry, yet the tendency is to take only a minimum rather than an adequate amount. A party should always carry an extra week's reserve of fuel when high on McKinley. It is inviting tragedy not to have at least seven days' supply of fuel if one plans to spend even one night above 17,000 feet (5,200 m) on Denali. This fuel must be used to provide each climber with at least three quarts (3 l) of liquid each day. Many experienced high altitude mountaineers recommend as much as six quarts (6 l) of liquid per person each day. Water bottles should be filled as often as possible and kept in sleeping bags at night to prevent freezing.

Fatigue. To a considerable extent, Denali represents a problem in logistics and weather so that climbers often feel that they must make the best use of good climbing conditions even though doing so may over-extend the physical and emotional capabilities of some or all of the party. If violent weather overtakes them in this condition, tragedy can follow. Climbers must maintain a physiological margin of safety against fatigue and cold just as they do for food and fuel. In this connection, it has been

suggested that the extra effort of preparing igloos or snow caves for shelter at high altitude rather than putting up tents, is well worthwhile in terms of the greater protection and rest afforded.

Carbon Monoxide poisoning. Cooking in poorly ventilated areas such as tents with all doors and vents closed, or old ice glazed igloos and snowcaves, produced two serious cases of CO poisoning in 1985 and two deaths in 1986. We suspect that many others also suffered lesser forms of CO poisoning. Furthermore, it seems very likely that CO poisoning may be a common contributor to AMS. It is difficult to diagnose the difference between Mountain Sickness and early symptoms of CO poisoning. Avoid the temptation to heat shelters with cooking stoves. Allow for good ventilation. Extra caution is necessary if two stoves are being used at the same time.

"Carbon monoxide poisoning among mountaineers is probably much more common than realized. The effects of CO and altitude hypoxia appear to be additive, and thus CO exposure at altitude is more dangerous than at sea level. Recent measurements by William Turner and Bill Sumner, on Denali, found toxic levels (greater than 750 parts per million) of CO near the stove in tents, snow caves and igloos. A major factor in producing CO is the damping effect on the flame of having the pot too close to the flame, and having water drop onto the flame from condensation on the pot. Keeping the pot warm and adding snow slowly to warm water thus produces much less CO than filling a pot with snow. Climbers cooking in shelters should try to minimize condensation on the cooking pot.

Adequate ventilation is the key to removing CO from a shelter. The Swiss climbers' tent was made of an apparently unbreathable material, and closing the vents sealed the tent as well as their fate. The same could happen when cooking in a tent completely buried by snow, or in an igloo with glazed ice walls on the inside. In a tent, ventilation is a function of the wind and the area of the vent opening. When cooking in a snow cave or igloo, the vent must be at least of ski pole basket-sized diameter, should be placed directly above the stove, and can be sealed when not cooking in order to maintain warmth. Climbers with symptoms of mountain sickness must be especially careful. CO poisoning should be considered in anyone unwell at altitude if using a combustible appliance in a closed shelter. Treatment is to stop the CO production, and have the victim, if conscious, hyperventilate in fresh air. Descent to a lower altitude, administration of oxygen, and forced

hyperventilation by mouth to mouth breathing may be required for comatose victims."

*1986 Analysis of the CO poisoning
deaths of two Swiss climbers on Mount
McKinley*

Peter Hackett, M.D.



photo by Bob Seibert

MANDATORY REQUIREMENTS

National Park Service personnel are concerned with the safety of climbers within the park and are responsible for fostering and enforcing safe mountaineering practices. The following regulations have been developed and *must be complied with* by expeditions planning climbs of Mount McKinley and Mount Foraker. They are also *recommended* for other climbs within the park.

Registration. The leader or organizer of the expedition must register with the Mountaineering Ranger before the start of the climb. Each climber must submit an individual registration listing previous climbing experience and major ascents. If registration forms can be filed from two to six months before the climb, this will provide the mountaineering staff an opportunity to evaluate the group's capability and to offer advice or assistance. Registration forms are available from the mountaineering office at the Talkeetna Ranger Station. With over 200 expeditions climbing in the park each season, it is imperative each party have a distinct name which should be used on all correspondence relating thereto.

Check In and Check Out. All members of each expedition must stop by the Talkeetna Ranger Station for an orientation and briefing prior to their departure for the expedition and upon their return from the climb. If you are planning a trip on the North side of the park and are unable to stop at Talkeetna, arrange in advance a briefing at Denali Park Headquarters.

Garbage and Human Waste. A National Park Service requirement in Denali National Park is that no equipment waste generated by climbing parties be left in the park. All fuel and food containers and damaged equipment must be packed out. Combustibles, however, may be burned first and the residue packed out. Human waste should be collected in a single container and dumped into a deep crevasse.

TALKEETNA RANGER STATION

Since 1977, the National Park Service has maintained a ranger station, specifically for mountaineers, in the Alaska bush community of Talkeetna. Since 1984, the station has been staffed year-round to provide information and assistance to mountaineers before, during, and after their climbs.

A collection of over 150 high quality photographs of the Central Alaska Range by Dr. Bradford Washburn is available for viewing at the ranger station. This extensive collection covers most of the major peaks and routes in Denali National Park. A duplicate set of photographs is maintained year round at the McKinley Park Headquarters.

The National Park Service also maintains a reference library including a complete set of American Alpine Journals and map collection in Talkeetna to aid expeditions in planning climbs.

The Talkeetna Ranger Station is a rustic log cabin in the center of downtown Talkeetna.

REFERENCE MATERIALS

History and Information

American Alpine Journal. Excellent reference for route information. Route descriptions available in year following first ascent.

Hall of the Mountain King, by Howard Snyder. Charles Scribner's Sons; New York, New York; 1973.

High Alaska; A Historical Guide to Denali, Mt. Foraker, and Mt. Hunter, by Jonathan Waterman. American Alpine Club; New York, New York 1987.

Minus 148, by Art Davidson. W.W. Norton and Co., Inc.; New York, New York; 1969.

Mount McKinley, History and Evaluation, by Bradford Washburn. The Mountain World, 1956-57. Harper Bros., publishers. This book, although out of print and very difficult to locate, offers a great deal of information for climbers in the Alaska Range.

Mount McKinley: A Climber's Guide (English and Japanese), is available from the Mountaineers Books, 715 Pike Street, Seattle, Washington 98101. This guide contains a great deal of useful information but the equipment lists were based on early climbs and may recommend excessive amounts of fixed line and climbing hardware.

Mt. McKinley Climbers Handbook, by Glenn Randall, Genet Expeditions, Talkeetna Alaska, 1984.

White Winds by Joe Wilcox, Hwong Publishing Company, Los Alamitos, California, 1981.

Mountain Safety

Accidents In American Mountaineering. Booklet by the American Alpine Club. 1977 to present especially applicable.

Surviving Denali: A Study of Accidents on Mount McKinley, 1910-1982, by Jonathan Waterman. American Alpine Club; 113 East 90th; New York, New York 10028; 1983.

Going High: The Story of Man and Altitude by Charles S. Houston, M.D. American Alpine Club; 113 East 90th; New York, New York 10028

Medicine for Mountaineering, by J.A. Wilkerson, M.D. The Mountaineers; Seattle, Washington. Third Edition. 1986.

Mountain Medicine and Physiology. Mountain Safety Research; Seattle, Washington; 1977.

Mountain Sickness: Prevention, Recognition, and Treatment (2nd Edition), by Peter Hackett, M.D. American Alpine Club, Inc.; 113 East 90th Street; New York, New York 10028. \$4.50 each. Highly recommended for expedition medical kits. 1980.

Denali National Park and Preserve Annual Mountaineering Summary. Published annually in the American Alpine Journal.

Altitude Illness — 1976 Version, by Charles S. Houston, M.D., American Alpine Journal, 1976.

Frostbite, by Bradford Washburn, American Alpine Journal, 1962. Unillustrated reprints available from Museum of Science; Science Park; Boston, Massachusetts 02114.

Magazines

Climbing magazine. Various issues including November-December 1979 and November-December 1980.

Mountain magazine. Various issues.

Off Belay magazine. Various issues including “Crisis on Denali,” December 1976. *Off Belay* is no longer published but back issues may still be available.

Summit magazine. Various issues.

Maps

Map of Mount McKinley, Alaska, scale 1:50,000 edited by Bradford Washburn, shaded relief covers area about 20 square miles centered on the summit of Mount McKinley. Available from Alaska Natural History Association, P. O. Box 9, McKinley Park, Alaska 99755 and from most mountaineering shops.

Map of Denali National Park and Preserve, plain contour or shaded relief scale 1:250,000. Also topographic maps in 15' quadrangles, scale 1:63,360 covering this and adjacent areas.

Determine your needs from the "Index to Topographic Maps of Alaska" which can be obtained from: U.S. Geological Survey; Distribution Section; Federal Center; Denver, Colorado 80225. Alaska residents may order limited quantities of Alaska maps from the U.S. Geological Survey; Distribution Section; 101 12th Avenue; Fairbanks, Alaska 99701.

Other Climbing Areas

Inquiries about climbing in the following areas of Alaska should be sent to the address listed below:

The St. Elias Range
(including Mount Logan)

Mountaineering Warden
Kluane National Park
Haines Junction, Yukon Territory
CANADA Y0B 1L0

Fairweather Range

Glacier Bay National
Park and Preserve
Bartlett Cove
Gustavus, Alaska 99826

Brooks Range

Gates of the Arctic
National Park & Preserve
P. O. Box 74680
Fairbanks, Alaska 99707

Wrangell Mountains

Wrangell-St. Elias
National Park & Preserve
P. O. Box 29
Glenallen, Alaska 99588

NOTES:

